

addition in the pig and scrap process, in the basic open-hearth furnace.

In most cases, a phosphorus content up to about 0.5 per cent, is actually self-acting, and therefore removed without trouble, but larger amounts of phosphorus make themselves disagreeably sensible, as is clearly apparent from Harbord's trials at Bilston, quoted on pp. 173 and 192.

This is due to the circumstance that dephosphorisation is only achieved in the basic open-hearth furnace if after its removal from the iron the phosphorus is able to go over undestroyed into the stable form of calcium phosphate. Such large amounts of iron peroxide are requisite for dephosphorisation that not only dephosphorisation as iron phosphate may occur, but that adequate iron peroxide remains over, to be engaged on the carbon so long and to hold it from the iron phosphate until in time its decomposition is completed.

In the pig and scrap process, such like amounts of iron oxide are not, however, at disposal, and therefore any iron phosphate by chance formed must be again at least partially decomposed by carbon, and thus a corresponding amount of phosphorus returned to the iron.

Hence, purification of the bath takes place only slowly, and a final product must be produced, which has taken up large quantities of oxygen and is therefore superoxidised. Nevertheless, working with highly phosphoric pig iron is possible in the open-hearth furnace, but only by employment of an artifice. The bath must then be charged with an excess of carbon, and a large amount of ore must be added immediately after melting down. The removal of phosphorus takes place immediately, and also the change into lime phosphate can be accomplished without difficulty. The high carbon content hereafter consumes the oxygen of the ore added. The reduction of the ore necessitates, however, a higher heat demand, and thereby causes a protraction of the process.

The employment of highly phosphoric pig iron consequently involves a deviation from the pure pig and scrap process, and the method approximates to that of the pig and ore processes, to be described later.

In the real purely pig and scrap process it is sought so to